

A3  
SUB  
B2

13. (Amended) A method for predicting resistance of a pathogen to a therapeutic agent comprising:

- (a) providing a neural network;
- (b) training the neural network on a training data set, wherein each member of the training data set corresponds to a genetic mutation that correlates to a phenotypic change that causes a change in therapeutic agent resistance of the pathogen;
- (c) providing a determined genetic sequence from the pathogen; and
- (d) predicting resistance of the pathogen to the therapeutic agent using the determined genetic sequence and the trained neural network to identify at least one mutation of the determined genetic sequence that confers resistance to the therapeutic agent.

A4  
SUB  
B3

20. (Amended) A trained neural network capable of predicting resistance of a disease to a therapeutic agent, wherein the trained neural network comprises:

- (a) a set of input nodes, wherein each member of the set of input nodes corresponds to a mutation in the genome of the disease; and
  - (b) a set of output nodes, wherein each member of the set of output nodes corresponds to the therapeutic agent used to treat the disease
- and wherein the trained neural network was trained using a training data set comprising members that correspond to at least one genetic mutation that correlates to a phenotypic change that causes a change in resistance of the disease to the therapeutic agent.